

EXPRESS MAIL LABEL NO. EV343426567US

WHAT IS CLAIMED IS:

1. A driving device for driving at least one power transistor of a voltage converter that includes a piezoelectric transformer, the at least one power transistor having a first non-drivable terminal coupled to an input voltage and to the input of the piezoelectric transformer, the converter further including an inductor coupled between the input voltage and the piezoelectric transformer, and a resistor coupled between a second non-drivable terminal of the at least one power transistor and ground, the driving device being coupled to the drivable terminal of the at least one power transistor, to the input of the piezoelectric transformer, and to the second non-drivable terminal of the at least one power transistor so as to detect a first voltage value and a second current value, the driving device being adapted to cause the turning on of the at least one power transistor if the first voltage value is equal to a third prefixed voltage value, and being adapted to cause the turning off of the at least one power transistor if the second current value is equal to a fourth prefixed current value.
2. The driving device according to claim 1, wherein the converter includes an error amplifier having an input connected to a voltage that is proportional to the output voltage of the converter, and another input connected to a reference voltage, the fourth prefixed current value being the value of the output current of the error amplifier and the second current value being the value of the current that goes through the resistor.
3. The driving device according to claim 2, wherein the third prefixed voltage value is a second reference voltage and the first voltage value is the value of the input voltage of the piezoelectric transformer.

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4. The driving device according to claim 3, wherein the driving device comprises:

a first comparator; and

a second comparator,

wherein the first comparator has an input coupled to the input of the piezoelectric transformer and another input coupled to the second reference voltage, the first comparator being adapted to cause the turning on of the at least one power transistor if the first voltage value is equal to the reference voltage, and

the second comparator is coupled to the second non-drivable terminal of the at least one power transistor and to the output of the error amplifier, the second comparator being adapted to cause the turning off of the at least one power transistor if the value of the current going through the resistor is equal to the output current of the error amplifier.

5. The driving device according to claim 4, wherein the driving device further comprises a third comparator having an input coupled to the second non-drivable terminal of the at least one power transistor and another input coupled to a reference current, the third comparator being adapted to cause the turning off of the at least one power transistor when the value of the current going through the resistor is equal to the value of the reference current.

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6. The driving device according to claim 1, wherein the driving device comprises:

a first comparator; and

a second comparator,

wherein the first comparator has an input coupled to the input of the piezoelectric transformer and another input coupled to a reference voltage, the first comparator being adapted to cause the turning on of the at least one power transistor if the first voltage value is equal to the reference voltage, and

the second comparator is coupled to the second non-drivable terminal of the at least one power transistor and to the output of an error amplifier, the second comparator being adapted to cause the turning off of the at least one power transistor if the value of the current going through the resistor is equal to the output current of the error amplifier.

7. The driving device according to claim 1, wherein the driving device comprises a third comparator having an input coupled to the second non-drivable terminal of the at least one power transistor and another input coupled to a reference current, the third comparator being adapted to cause the turning off of the at least one power transistor when the value of the current going through the resistor is equal to the value of the reference current.

8. The driving device according to claim 1, wherein the inductor is directly connected to the input voltage and to the input of the piezoelectric transformer.

9. The driving device according to claim 1, wherein the at least one power transistor is a single MOS transistor, the first non-drivable terminal being the drain terminal of the MOS transistor and the second non-drivable terminal being the source terminal of the MOS transistor.

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10. A switching voltage converter comprising:
- a piezoelectric transformer;
 - at least one power transistor having a first non-drivable terminal coupled to an input voltage and to an input of the piezoelectric transformer;
 - an inductor coupled between the input voltage and the piezoelectric transformer;
 - a driving device coupled to the drivable terminal of the at least one power transistor;
 - a resistor coupled between a second non-drivable terminal of the at least one power transistor and ground,
- wherein the driving device is also coupled to the input of the piezoelectric transformer and to the second non-drivable terminal of the at least one power transistor so as to detect a first voltage value and a second current value, the driving device being adapted to cause the turning on of the at least one power transistor if the first voltage value is equal to a third prefixed voltage value, and being adapted to cause the turning off of the at least one power transistor if the second current value is equal to a fourth prefixed current value.
11. The converter according to claim 10, further comprising an error amplifier having an input connected to a voltage that is proportional to the output voltage of the converter, and another input connected to a reference voltage, the fourth prefixed current value being the value of the output current of the error amplifier and the second current value being the value of the current that goes through the resistor.
12. The converter according to claim 11, wherein the third prefixed voltage value is a second reference voltage and the first voltage value is the value of the input voltage of the piezoelectric transformer.

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13. The converter according to claim 12, wherein the driving device comprises:
a first comparator; and

a second comparator,

wherein the first comparator has an input coupled to the input of the piezoelectric transformer and another input coupled to the second reference voltage, the first comparator being adapted to cause the turning on of the at least one power transistor if the first voltage value is equal to the reference voltage, and

the second comparator is coupled to the second non-drivable terminal of the at least one power transistor and to the output of the error amplifier, the second comparator being adapted to cause the turning off of the at least one power transistor if the value of the current going through the resistor is equal to the output current of the error amplifier.

14. The converter according to claim 13, wherein the driving device further comprises a third comparator having an input coupled to the second non-drivable terminal of the at least one power transistor and another input coupled to a reference current, the third comparator being adapted to cause the turning off of the at least one power transistor when the value of the current going through the resistor is equal to the value of the reference current.

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15. The converter according to claim 10, wherein the driving device comprises:
a first comparator; and
a second comparator,
wherein the first comparator has an input coupled to the input of the piezoelectric transformer and another input coupled to a second reference voltage, the first comparator being adapted to cause the turning on of the at least one power transistor if the first voltage value is equal to the reference voltage, and
the second comparator is coupled to the second non-drivable terminal of the at least one power transistor and to the output of an error amplifier, the second comparator being adapted to cause the turning off of the at least one power transistor if the value of the current going through the resistor is equal to the output current of the error amplifier.
16. The converter according to claim 10, wherein the driving device comprises a third comparator having an input coupled to the second non-drivable terminal of the at least one power transistor and another input coupled to a reference current, the third comparator being adapted to cause the turning off of the at least one power transistor when the value of the current going through the resistor is equal to the value of the reference current.
17. The converter according to claim 10, wherein the inductor is directly connected to the input voltage and to the input of the piezoelectric transformer.
18. The converter according to claim 10, wherein the at least one power transistor is a single MOS transistor, the first non-drivable terminal being the drain terminal of the MOS transistor and the second non-drivable terminal being the source terminal of the MOS transistor.